USE OF TANTALUM DRAINS IN GLAUCOMA*

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FOR as long as operative interference is necessary in glaucoma, so I suppose will ophthalmic surgeons try to devise new ways of reducing intra-ocular tension by drainage.

Recently the reading of an article (Bick, 1949) on the use of tantalum metal in drainage of the eye, has tempted me to submit this brief account of some efforts on my own part over the last few years to achieve successful intra-ocular drainage by the use of metal drains. Bick gives a comprehensive account of the use of foreign material implants in the eye for the purpose of drainage, from the earliest attempts of Rollet and Moreau (1906), who used a horsehair seton, to his own experiments in the same direction using implants of the metal tantalum.

These tantalum implants were used chiefly to keep open a supra-choroidal channel following a cyclodialysis, and he gives an account of four cases in which this procedure was carried out on human eyes. In three of these cases the implant had to be removed owing to a subsequent rise in tension. He concludes his article by affirming that the use of a tantalum drain is justifiable in desperate cases of glaucoma.

Accounts of tantalum—its inertness and its ready acceptance by human tissue without reaction—made me think that it might be used to keep open a small filtering scar in cases of high intra-ocular tension. I conceived it as more or less taking the place that the portion of iris in the wound does in the operation of iridencleisis.

The first idea that seemed feasible was to have a small piece of tantalum wire shaped thus: 6. the distance from *a* to *b* being 4 mm., and the distance from the line *ab* to *c* being 3 mm. Early in 1947 it was tried out as follows: a small conjunctival flap being turned down, a keratome incision was made into the anterior chamber just behind the corneo-scleral junction and the loop *c* was gently inserted into it and pushed down into the anterior chamber until the whole little metal contrivance was supported by the arms *ab* projecting slightly on either side of the keratome incision. The flap was replaced with a suture.

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In the first few cases it worked well for some weeks, and then the tension began to rise again. There was no reaction to the metal at all—the iris was clean and quiet, and nothing abnormal could be detected by the slit lamp, except the bright glittering little loop lying quietly in the anterior chamber. Six cases were treated in this way, but after varying periods all six stopped draining. A trephine had to be done later, and in four the drain was removed. All one could find when removing the drain was that there appeared to be much scar tissue round the “arms” of the drain, which seemed to be the cause of the “sealing up” of the drainage wound. Two were left in, although trephined, and they are still there with no reaction whatsoever after two and a half years.

FIG. 1.—Tantalum drain.

FIG. 2.—Sectional diagram, showing straight drain in position.

As the wire drain attained no permanence so far as drainage was concerned, and was yet so well tolerated by the eye, there seemed to be some prospect of gaining permanent drainage if one could design a better drain. Accordingly a drain was devised, which it was thought might give more permanent results by leading the aqueous further back into the tissues. This drain was in the form of a flattened tube—open down the back and tapering from back to front (see Fig. 1).*

It was hoped that this triangular form would fit into the triangular opening of a keratome incision.

The technique of inserting the drain was the same simple one: dissection of the conjunctival flap up to the corneal margin, small, very oblique keratome incision, insertion of drain, and reposition of flap. The position of the drain is shown in Fig. 2.

* These drains were beautifully made for me by Messrs. G. Nissel and Co., Ltd., Siddons Lane, Baker Street, London, N.W.1, meticulously polished and finished.

In all, 25 of these drains have been used since 1948. No significant reaction has been found to any of them, though only two have kept the tension down for more than three to four months. Their use has, however, allowed cases of secondary and very advanced glaucoma, to be dealt with in the least traumatic manner possible.

Figs 3 and 4 show the drains in position in a case of old bilateral iridocyclitis with secondary glaucoma. These drains were inserted in June, 1949, and the tension in both eyes still remains low.

FIG. 5.—Sectional diagram, showing newer type of slightly curved tantalum drain in position.

I found with some of the original type of straight drain that the narrow end tended to dig into the iris, and I have latterly had some made by Messrs. G. Nissel with a double curve (like a very shallow S). These are much easier to insert and they accommodate themselves better to the curve of the sclera and to the incision, while they do not tend to dig so much into the iris (see Fig. 5).

In spite of the fact that the majority of cases tend to close up eventually so that the tension rises again, I have found these drains of much value:

- (1) in acute glaucoma;
- (2) in cases of high tension associated with iritis or iridocyclitis;
- (3) in those cases of very advanced glaucoma with little visual field left, where one fears that the shock of a more drastic operation associated with sudden drop in tension may lead to final obscuration of vision. In these cases the trauma inflicted on the eye is the minimum possible, and when the tension has been lowered for some weeks and the eye is what might be termed "stabilized", a more permanent form of operation can be proceeded with in greater safety.

These few notes are proffered in the hope that others with greater facilities than are possessed here may be tempted to further and more successful experiments.

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